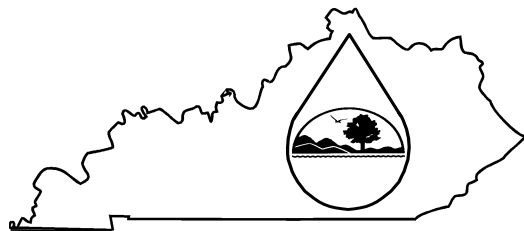


# KPDES FORM SDAA



## Kentucky Pollutant Discharge Elimination System (KPDES)

### Socioeconomic Demonstration and Alternatives Analysis

The Antidegradation Implementation Procedure found in 401 KAR 10:030, Section 1(3)(b)3 requires KPDES permit applications for new or expanded discharges to waters categorized as "Exceptional or High Quality Waters" to conduct a socioeconomic demonstration and alternatives analysis to justify the necessity of lowering local water quality to accommodate important economic or social development in the area in which the water is located. This demonstration shall include this completed form and copies of any engineering reports, economic feasibility studies, or other supporting documentation

#### I. Project Information

**Facility Name:** Ed Gaunt

**Location:** 59 Warriors Path, Flat Lick, Kentucky 40935

**County:** Knox

**Receiving Waters:** Lick Branch

#### II. Socioeconomic Demonstration

##### 1. Define the boundaries of the affected community:

(Specify the geographic region the proposed project is expected to affect. Include name all cities, towns, and counties. This geographic region must include the proposed receiving water.)

The project is located in the Eastern coal fields of Knox County near the community of Flat Lick. Flat Lick has a population of 2,799 persons and occupies 57.97 square miles. It is bordered on the west by Whitley County, on the north by Laurel County and Clay County and, on the east by Bell County. The region is characterized by high, sharp crested ridges, narrow valleys and little upland area. The HUC 8 receiving watershed is the Upper Cumberland River (HUC 05130101).

This project proposes surface disturbance of 2.5 acres with one bench sediment control structure.

This project proposes discharge into Lick Branch, a first order watershed which discharges into Stinking Creek of the Upper Cumberland River Basin.

\*uszip.com

## 2. The effect on employment in the affected community:

(Compare current unemployment rates in the affected community to current state and national unemployment rates. Discuss how the proposed project will positively or negatively impact those rates, including quantifying the number of jobs created and/or continued and the quality of those jobs.)

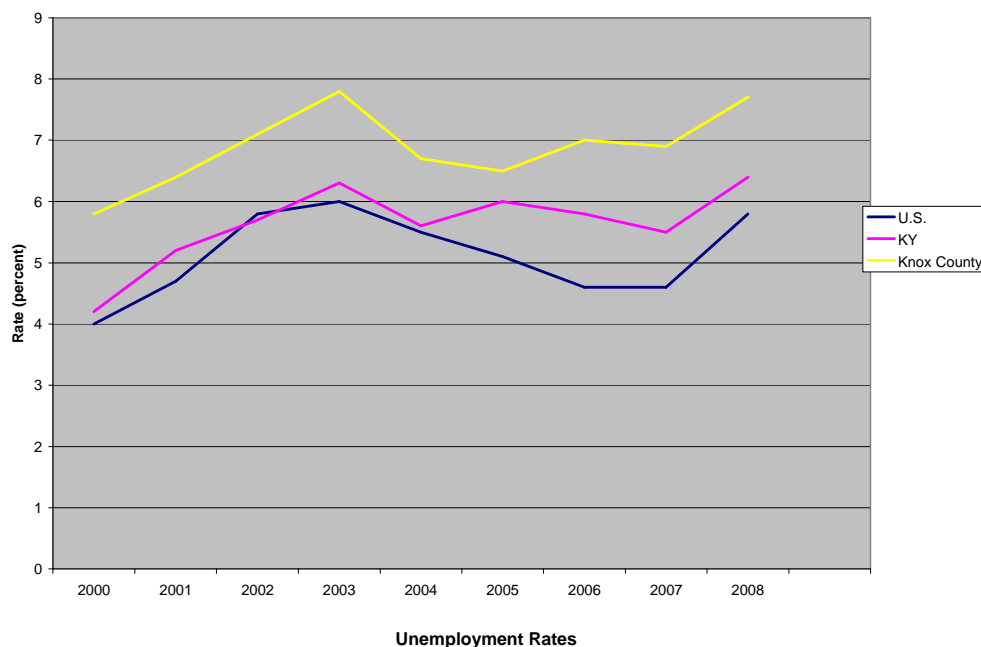
The small community of Flat Lick in Knox County historically has an unemployment rate significantly higher than the state and national averages. In August 2009, the unemployment rate for Knox County was 12.1%, the rate for Kentucky was 10.8% and the national unemployment rate was 9.6%.

This project will employ 3 people who will be local residents. The average income realized from the direct jobs provided by this project will be approximately \$36,000 year/household or over \$100,000/year collectively.

Studies indicate that the mining industry creates 3 indirect related jobs for each actual direct mining position.\* Based on these indicators, over 12 jobs will be supported by this project. In 2007, 31.3%\*\* of Knox county's residents were living below the poverty level. According to quick facts from the U.S. census, private, nonfarm employment dropped by 26.6% in Knox County from 2000 to 2006.

\*Source: University of Kentucky Center for Business and Economic Research: Economic Impact Analysis of Coal in Kentucky, (1995-2004) by Haywood and Baldwin

\*\*Source: U.S. Census Bureau, Small Area Estimate Branch



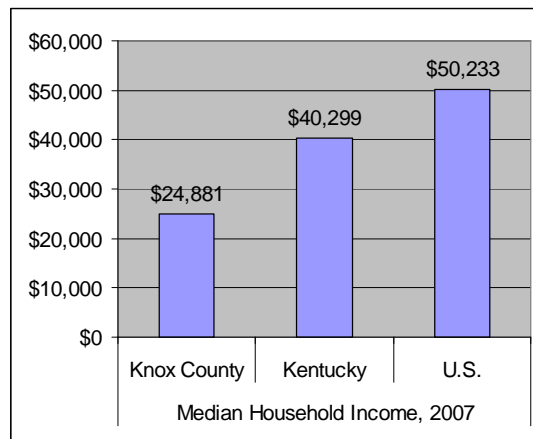
In addition to the 3 direct jobs provided by this project, it will also provide for more employment indirectly in mining service jobs. These jobs include equipment sales, mining engineering consultants, food service, fuel sales, transportation, coal washing and blending. The mining industry directly contributes to Knox County's economy through real taxes, personal property taxes and the state severance tax. The severance tax rate for coal is 4.5% of which 50% is slated to be returned to the county of origin. Tax revenues for coals severed and processed in Knox County in the 2006-2007 fiscal year totaled over \$900,000 dollars. Severance tax dollars are used for such things as infrastructure, education, development and recreation. This project will contribute to this tax base and help provide funding for county improvements.

## II. Socioeconomic Demonstration- continued

### 3. The effect on median household income levels in the affected community:

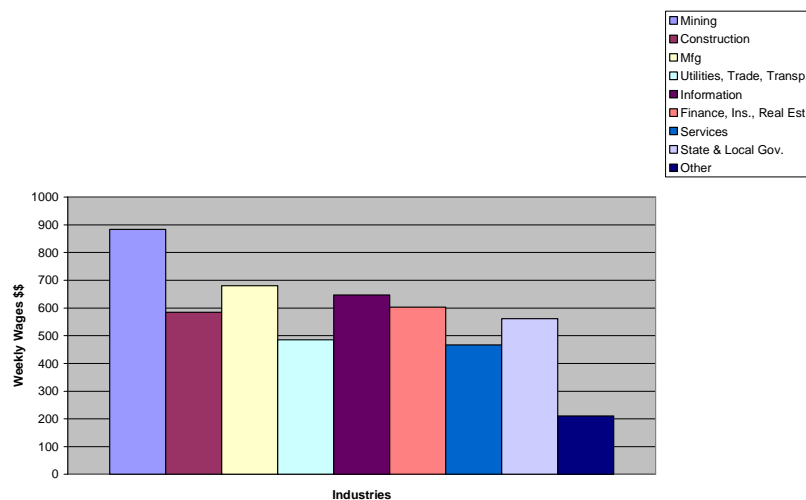
(Compare current median household income levels with projected median household income levels. Discuss how proposed project will positively or negatively impact the median household income in the affected community including the number of households expected to be impacted within the affected community.)

The median household income in Knox County in 2007 was \$24,881 which is less than half of the median income of the United States and only 60% of the state's statistics.



The estimated annual income of the direct jobs provided by this project is \$36,000/year. While this project may not raise the median income of the county, mining jobs historically pay the highest wages in the Knox County.

Knox County Wages by Industry 2007



*\*Average Weekly Wages by Industry Division Covered by Unemployment Insurance:2007, [www.bls.gov](http://www.bls.gov)*

**4. The effect on tax revenues of the affected community:**

(Compare current tax revenues of the affected community with the projected increase in tax revenues generated by the proposed project. Discuss the positive and negative social and economic impacts on the affected community by the projected increase.)

This project is expected to increase local, state and federal revenues from the extraction, processing, and sales of the recovered resource.

Production from this area is expected to exceed 10,000 tons over the life of the project. Estimates for a fraction of the tax revenue based on \$52/ton\* selling price include:

Federal excise tax	\$1.10/ton	\$11,000
Reclamation Tax	\$0.35/ton	\$3,500
Ky Severance Tax	4.5% of sales price	\$23,400

Recovered reserves as well as reserves in situ are subject to taxation. Monies paid to employees are subject to state, federal and local taxes. Tangible equipment and properties are also taxed. Providing 3 direct jobs and an additional 9 support jobs, monies received in salaries will also support the local economy by boosting sales in the area.

During the operation, such things as dust, noise and increased traffic have the potential to temporarily decrease the value of a surrounding property. However, the decreased values should be minimal and limited to the life of the permit. The overall value of the mining property will decrease after all of the coal has been removed however there should be no decrease in the value of the surface land within the bonded mine site. The erection of a residence on the site will increase property tax value, will improve the aesthetics of the site and provide housing for a local resident.

*\*EIA, Sept. 14, 2009 Sport Market Prices*

## II. Socioeconomic Demonstration- continued

### 5. The effect on an existing environmental or public health in affected community:

(Discuss how the proposed project will have a positive or negative impact on an existing environmental or public health.)

Before the recovery of resources, this area will be cleared and grubbed. Drainage will be directed to flow in ditches to the sediment control structure to prevent solids from entering the receiving stream. After removal of the coal reserves, this area will be graded to provide a house seat for the owner. Reclamation efforts will include grading and seeding to provide controlled drainage from the area. This area will be maintained as a residential location.

### 6. Discuss any other economic or social benefit to the affected community:

(Discuss any positive or negative impact on the economy of the affected community including direct and or indirect benefits that could occur as a result of the project. Discuss any positive or negative impact on the social benefits to the community including direct and indirect benefits that could occur as a result of the project.)

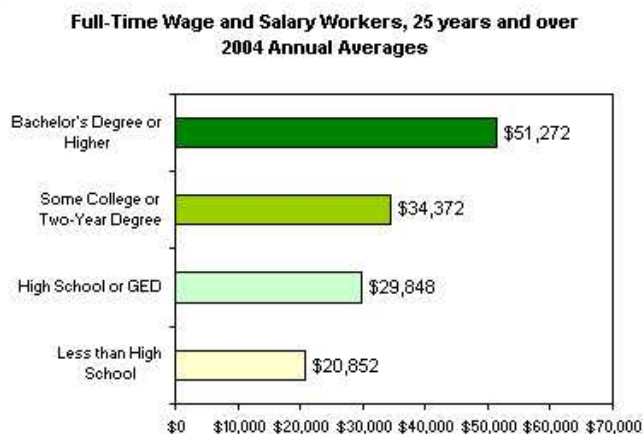
The addition of a residence to this property will increase county tax revenues, improve the aesthetics of the site and provide a building site for a county resident.

Economically this project will also benefit retailers, service industry personnel, food establishments and entertainment industries in the community. Severance tax dollars fund basic needs such as water and sewer projects but also fund recreational, social and cultural developments as well.

The average weekly earnings for a mining employee in Knox County in 2007 were \$884.38 while the county average for all industries was \$533.09.\* Mining employees wages averaged more than all other Knox County workers. The income realized from the direct jobs provided by this project will be near \$36,000 year/employee or near \$100,000/year collectively. Currently Kentucky ranks 44<sup>th</sup> nationally in per capita income. The jobs provided by this project allow these households to earn more than most other occupations in Knox County including construction, manufacturing, utilities and real estate

Numerous studies indicate that a person's earning potential can be directly linked to his or her level of education.

In 2008, only 8.8% of Knox County residents held bachelors or higher degree and 45.9% of residents did not have high school diplomas greatly limiting their earning potential. It is estimated that a persons with only a high school education will earn approximately half of what a person with a college degree with similar experience would earn. A person lacking a high school education will earn a third of the income of a college graduate:



Source: U.S. Bureau of Labor Statistics

These earnings will help these households to maintain or improve their current economic status and provide opportunities for gains in social welfare only realized from enhanced income. Higher earnings have been linked to lower crime rates, reduced welfare and healthier lifestyles.

This project will remove approximately 10,000 tons of coal that would not have been recovered or made available to the market otherwise. This will result in employment for approximately 12 people, aid in development and maintenance of indirect jobs and will increase the amount of money the area receives in personal and severance taxes. Knox County should see the return of near \$12,000 in severance tax dollars from this project alone.

### III. Alternative Analysis

#### 1. Pollution prevention measures:

(Discuss the pollution prevention measures evaluated including the feasibility of those measures and the cost. Measures to be addressed include but are not limited to changes in processes, source reductions or substitution with less toxic substances. Indicate which measures are to be implemented.)

As an alternative treatment option, sand filtration was evaluated but deemed not applicable. Sand filtration is used primarily as a pre-treatment to remove microbial contaminants, not particulate matter, in storm run-off in smaller, urban drainage areas. The high solids involved in a storm event could possibly clog the filtration unit rendering it ineffective. Sand filters do not control storm water run off and do not prevent downstream bank and channel erosions as proposed sediment structures are design to do. Also, the operational effectiveness of these units in colder climates and freezing conditions are not yet know. Studies indicate a treatment cost of \$12 per cubic foot for this type of treatment.

Constructing an on-site storm water treatment facility was considered. The volume of discharge and the lift required make this an unfeasible option. Consultation with Beckman Environmental in Cincinnati, Ohio, a company that specializes in these types of constructions, revealed a recent bid on a project in Columbus, Ohio involving a lift of 30 feet, a peak discharge of 3800 gpm, a grit removal station, and influent and effluent lines at \$2.5 million dollars. Using this scenario, treatment would exceed \$650/gallon volume.

Choosing not to mine this area as an alternate to lowering water quality was evaluated but since this location is going to be impacted in preparation for a house site, regulations associated with the resource recovery will require adherence to all limitations of dust, noise and environmental impacts.

Alternate mining locations and mining methodologies are not applicable to this project.

This operation will use surface techniques to recover coal reserves. Existing roads and infrastructure will be used

**2. The use of best management practices to minimize impacts:**

(Discuss the consideration and use of best management practices that will assist in minimizing impacts to water quality from the proposed permitted activity.)

Prudent care will be exercised to minimize impacts to water quality within the permit area.

Construction and in-stream work will be scheduled during low flow or no flow conditions as feasible.

Silt control will be established before this area is disturbed.

Existing vegetation will be preserved as possible and vegetative cover will be reestablished as soon as possible.

All water leaving the permit area will pass through a sediment control structure before exiting the permit area. These structures are engineered to be the most efficient and least invasive and are designed to prevent sediment from entering the stream in significant quantities by allowing ample time for solids to settle to the bottom of the pond.

Point source discharge will be specifically identified as to source and location. Surface and ground water monitoring plans have been designed, and will be used to identify any alteration in water quality or quantity.

Compliance with the limits established for the outlets in the KPDES permit are designed to prevent adverse impacts to the receiving channels.

Temporary sediment control devices, including silt fences, hay bales, ditches and berms will be used to direct flow to the sediment structures.

Stockpiles and/or overburden storage sites will be placed out of drainage patterns.

Upon completion of mining, all exposed coal seams and any toxic, combustible or other waste materials will be covered with a minimum of four feet of non-toxic and non-combustible material. This material may be blended or treated to neutralize toxicity in order to prevent pollution, sustain combustion, and/or minimize any adverse affects.

An emergency spill response and clean up plan will be maintained to prevent potential release into the waterway.



**3. Recycle or reuse of wastewater, waste by-products, or production materials and fluids:**

(Discuss the potential recycle or reuse opportunities evaluated including the feasibility of implementation and the costs. Indicate which of, of these opportunities are to be implemented)

Limited potential for recycle or reuse of water exists within the project area.

Water from sediment control structures could be used for on site dust suppression, hydroseeding and when applicable deep mine and preparation plant operation.

Dust suppression typically involves using large water trucks to spray haul roads, material stockpiles, and other non-vegetated areas being worked by equipment.

The volume of these tankers vary but an industry average is about 4,000 -5,000 gallons. Depending on the size of the operation and weather conditions, an operation could use up to 30,000 gallons of water per day for dust suppression during dry conditions. Estimating that suppression would be needed 100 work days in a calendar year, the annual usage would be 3 million gallons.

During reclamation, hydroseeding is used to evenly distribute seed, fertilizer and mulch without encroaching on minimally compacted areas. Hydroseeding is the process where seed, fertilizer, mulch, and water are mixed together to form a slurry mixture that is sprayed, under pressure for seeding. The ratio of seed mixture to water varies but an approximate ratio is 1:3. In order to use hydroseeding as an application process, access to a water source has to be within close proximity of the project.

Industry reclamation personnel estimate the usage of water resources for hydroseeding application at 3500 gallons per acre. Water application to hydro seed this permit area would be approximately 7,000 gallons. This represents a one-time application of which the majority would occur after resource recovery is completed.

Preparation plants are normally fixed structures whose location may be central to several operations and rail loading facilities. Preparation plants routinely withdraw water for the operation of these facilities however; there is no preparation plant at this site.

This project proposes to use surface techniques to recover these coal reserves. Underground mining use is not applicable to this project.

### III. Alternative Analysis - continued

#### 4. Application of water conservation methods:

(Discuss the potential water conservation opportunities evaluated including the feasibility of implementation and the costs. Indicate which of, of these opportunities are to be implemented)

Available and practical water conservation methodology will be employed by Ed Gaunt during the life of this project.

The drainage area for this permit amendment area is 2.5 acres. The possible peak discharge during a 10 year/24 required storm event could be 3,871 gallons per minute.

Water from sediment control structures can be used for on site dust suppression, hydro seeding and when applicable preparation plant operation.

Dust suppression typically involves using large water trucks to spray haul roads, material stockpiles, and other areas being worked by equipment.

The volume of these tankers vary but an industry average is about 4,000 -5,000 gallons. Depending on the size of the operation and weather conditions, an operation could use up to 30,000 gallons a water per day for dust suppression during dry conditions. Estimating that suppression would be needed 100 work days in a calendar year, the annual usage would be 3 million gallons.

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Industry reclamation personnel estimate the usage of water resources for hydroseeing application at 3500 gallons per acre. Water application to hydro seed this permit area would be approximately 7,000 gallons. This represents a one time application of which the majority would occur after resource recovery is completed.

Preparation plants are normally fixed structures whose location may be central to several operations and rail loading facilities. Preparation plants routinely withdraw water for the operation of these facilities. There is no preparation plant at this site.

Using water already impounded in the sediment control structures for these purposes conserves water and confines withdrawal to the project location. However, not all the water resulting from this site can be used for these purposes and discharge is still necessary to the mining process and to maintain the stream function.

**5 Alternative or enhanced treatment technology:**

(Compare feasibility and costs of proposed treatment with the feasibility and costs of alternative or enhanced treatment technologies that may result in more complete pollutant removal. Describe each candidate technology including the efficiency and reliability in pollutant removal and the capital and operational costs to implement those candidate technologies. Justify the selection of the proposed treatment technology.)

Sand filtration is used primarily as a pre-treatment to remove microbial contaminants, not particulate matter, in storm run-off in smaller, urban drainage areas. As an alternative treatment option, sand filtration was evaluated but deemed not applicable. The high solids involved in a storm event could possibly clog the filtration unit rendering it ineffective. Sand filters do not control storm water flow and do not prevent downstream bank and channel erosions as proposed sediment structures are designed to do. Also, the operational effectiveness of these units in colder climates and freezing conditions are not yet known. Studies indicate a treatment cost of **\$12 per cubic foot volume\*** for this type of treatment

The volume of discharge and the lift required make construction of an on-site water treatment facility unfeasible. Consultation with Beckman Environmental in Cincinnati, Ohio, a company that specializes in these types of constructions, revealed a recent bid on a project in Columbus, Ohio involving a lift of 30 feet, a peak discharge of 3800 gpm, a grit removal station, and influent and effluent lines at \$2.5 million dollars. Using this scenario, treatment would exceed **\$650/gallon volume**.

Accepting the more stringent discharge limitations was considered but because this would require more aggressive chemical treatment, the real potential for an environmental or personnel accident exist. The costs are extreme and it was dismissed. Based on information from OSMRE, the cost for chemical treatment of a mildly acidic mine drainage with an average flow of **100 gpm** using caustic soda was **\$94,784**. With a possible flow of 3,871 gpm during a 10yr/24hr rainfall event, the cost of this option would make the cost of this option prohibitive for this small project.

Comparatively, an industry estimate for construction of a medium capacity embankment pond is approximately **\$40,000** while construction of a dug out bench pond is estimated at roughly **\$7,500**. These structures are designed to comply with KPDES permit limitations preventing degradation of stream quality

### III. Alternative Analysis - continued

#### 6. Improved operation and maintenance of existing treatment systems:

(Discuss improvements in the operation and maintenance of any available existing treatment system that could accept the wastewater. Compare the feasibility and costs of improving an existing system with the feasibility and cost of the proposed treatment system.)

Sediment structures are designed to accommodate a 10 year 24 hour storm event while allowing time for settling of sediment prior to discharge into the receiving stream to meet effluent discharge limitations. Discharge from these structures is precipitation dependent and these structures are designed to safely impound and discharge the runoff from the project area while limiting the impact to what is required based on industry standards.

Treatment, including the use of flocculants, prior to entry into the sediment control structures was examined. Although sometimes effective treating concentrations of high solids, the use of flocculants would require additional equipment, construction and cost. The flocculent has to be dispersed into the stream, a "mixing" area has to be constructed and a primary "pond" is often recommended for the initial settling of large solid particles. Since the sediment control structure should, under normal conditions, effectively treat the solids from this project, this option creates additional impact, additional cost and additional hazards and is not necessary.

#### 7. Seasonal or controlled discharge options:

(Discuss the potential of retaining generated wastewaters for controlled releases under optimal conditions, i.e. during periods when the receiving water has greater assimilative capacity. Compare the feasibility and cost of such a management technique with the feasibility and cost of the proposed treatment system.)

Flow from the area will be controlled with the use of sediment structures, diversion ditches, and temporary sediment control devices so as not to create a plume, standing waters or fluctuations in normal water levels.

Sediment structures are designed to accommodate a 10 year 24 hour storm event while allowing time for settling of sediment prior to discharge into the receiving stream to meet effluent discharge limitations. Discharge from these structures is precipitation dependent and the design of the structures and the spillways does not facilitate the impounding water for a controlled hydrological release.

Pumping of the ponds is not anticipated except for removal during final bond release or during an unanticipated emergency event. If a situation requires pumping, then monitoring stations above and below the pumped inflow area will be established. The monitoring stations will measure flow and pH for significant increases. Pumping will not occur when flow is below the critical stream velocity of 1 c.f.s.

### **III. Alternative Analysis - continued**

#### **8 Land application or infiltration or disposal via an Underground Injection Control Well**

(Discuss the potential of utilizing a spray field or an Underground Injection Control Well for shallow or deep well disposal. Compare the feasibility and costs of such treatment techniques with the feasibility and costs of proposed treatment system.)

A minimal amount of water may be withdrawn from sediment structures for hydroseeding and dust control but broader land application is not applicable. Usage for hydroseeding and dust suppression is site specific but a median estimate for hydroseeding usage is 3500 gallon/acre and for dust suppression 30,000/day for 100 days/year.

All the water resulting from this site cannot be used for these purposes and discharge is still necessary to the mining process and to maintain the stream function.

There are no known underground works in the area that could be considered as a subsurface disposal option. Such works are considered as potentially dangerous due to the uncertainty of the condition of the remaining structures. The possibility exists that pumping water into these works could cause a "blow-out" or leakage leading to both a public safety and environmental threat.

#### **9 Discharge to other treatment systems**

(Discuss the availability of either public or private treatments systems with sufficient hydrologic capacity and sophistication to treat the wastewaters generated by this project. Compare the feasibility and costs of such options with the feasibility and costs of the proposed treatment system.)

The nearest sewage treatment plant is approximately 7 miles away at Pineville, Kentucky. The plant was not designed for, or capable of, effectively treating either the type or volume of water possible with this project. Influx of water from this facility would overload this facility leading to a bypass which would result in the discharge of untreated municipal wastes creating a potentially serious public health risk

Because of the terrain, routing water to this plant would require approximately 37,000 ft of carrier line, an extensive network of pump and lift stations and obtaining numerous easements and right-of-ways. Conservatively estimating line at \$22/foot, a minimum of 2 lift stations per mile, a central collection system, ignoring other requirements, the minimum cost of this option would exceed \$1.5 million dollars.

**\*Table 1  
Pressure (LPS)**

<i>Pumping Stations (No. per mile by topography)</i>	<i>Flat</i>	<i>Rolling</i>	<i>Steep</i>
200 gpm P.S. \$54,000	0	0	2
100 gpm P.S. \$43,200	0	1	2
Composite Cost	\$0	\$43,200	\$194,400

**Gravity**

<i>Pumping Stations (No. per mile by topography)</i>	<i>Flat</i>	<i>Rolling</i>	<i>Steep</i>
200 gpm P.S. \$54,000	1	0	2
100 gpm P.S. \$43,200	2	1	2
Composite Cost	\$140,400	\$43,200	\$194,400

*A Mathematical Model For Estimating Sewer Costs”  
by George A. Earle, III, P.E. and R. Paul Farrell Jr., P.E.,  
Environment One Corporation*

\*Lift stations are site specific and vary greatly but are specific to topography and substrate composition:

Transporting this volume of water by self-contained disposal trucks to a disposal site would be excessively expensive. Based on a 10 year, 24 hour storm event calculation, the possible peak discharge from this project could exceed 3,800 g.p.m.. Rates quoted from Somerset Environmental in Somerset, Kentucky indicated charges of \$65/hour (gate to gate)/3,000 gallon pick-up of non-hazardous wastewater and a \$0.49/gallon disposal fee.

The excavation, grading and installation of lines and required lift stations would create detrimental environmental effects.

